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been raised whether it is not a belated member of the Cycadofilicales, and therefore any further information concerning it is desirable. BOMMER³³ has obtained material that supplies additional information, which he publishes in a preliminary announcement. The vascular structure of the plant suggests to him possible relationship with the Matoniaceae, but the sporangia, now found attached, are of special interest. They occur in synangia which resemble inverted cones, and possess an incomplete annulus, as in *Matonia*. Each synangium includes 10-15 sporangia, and the synangia themselves are grouped so as to form spherical bodies 3-4 mm. in diameter. These synangial groups are borne thickly on apparently naked branches of the frond. Such fructifications have been found heretofore detached. BOMMER is evidently undecided whether the most obvious testimony at present should decide for *Matonia* affinities; or whether certain vague suggestions should decide for a *Marattia* connection; or whether, after all, these synangia may not be the microsporangia of Cycadofilicales. This lack of decision is commendable.—J. M. C.

A classification of plants.—Professor BESSEY has long been interested in a general classification of plants which is quite a departure, in many respects, from current schemes. In 1909 he published in outline his ripened conclusions, together with the principles involved, and now he has furnished a key³⁴ by which the groupings are defined, so far as a key can define. It is impossible to give an account of the views expressed without reprinting the paper, for it is in itself the shortest possible statement. It is sufficient to say that the 4 conventional main groups are dissipated into 14 "phyla," whose technical and common names may serve to indicate them: Myxophyceae (slime algae), Protophyceae (simple algae), Zygomyceteae (conjugate algae), Siphonophyceae (tube algae), Phaeophyceae (brown algae), Carpophyceae (higher algae), Carpomyceteae (higher fungi), Bryophyta (mosses), Pteridophyta (ferns), Calamophyta (calamites), Lepidophyta (lycopods), Cycadophyta (cycads), Strobilophyta (conifers), Anthophyta (flowering plants). These phyla are broken up into 32 classes and 94 orders, not including the dicotyledons, which constitute class 33, with 5 "super-orders," the list of orders not being given.—J. M. C.

Seeds of the Conostoma group.—OLIVER and SALISBURY³⁵ have assembled the material of *Conostoma* for investigation, and have compared it with *Lagenostoma*, *Physostoma*, and *Gnetopsis*. A full description is given of *C. oblongum* and *C. anglo-germanicum*, and this is followed by a comparison with related

³³ BOMMER, CH., Contribution à l'étude du genre *Weichselia*. Note préliminaire. Bull. Soc. Roy. Bot. Belgique 47:296-304. figs. 18. 1911.

³⁴ BESSEY, CHARLES E., The phyla, classes, and orders of plants. Trans. Amer. Micr. Soc. 29:85-96. 1910.

³⁵ OLIVER, F. W., and SALISBURY, E. J., On the structure and affinities of the paleozoic seeds of the *Conostoma* group. Annals of Botany 25:1-50. pls. 1-3. figs. 13. 1911.

types and a taxonomic presentation of the group, in which *Gnetopsis elliptica* is placed provisionally with *Conostomum* in the "Conostomeae." A brief discussion of the "pollination mechanisms" of the Lagenostomales calls attention to the three distinct types exhibited by the group: that in which the free but approximated lobes of the integument surrounded and overtopped the pollen chamber and probably at pollination formed a funnel (*Physostoma*); that in which a massive "canopy" was pierced by a long micropyle (*Conostoma*); and that in which the compact canopy closely invested the conical pollen chamber, whose orifice reached to the outer surface (*Lagenostoma*). A glossary is provided at the close of the paper, since such terms as the "blow-off layer," "lagenostome," and "plinth" are not easily separated from the well-worn terms heretofore applied to the same structures.—J. M. C.

Anatomy of Azolla.—QUEVA³⁶ has investigated the vascular anatomy of *Azolla filiculoides*, and has secured some interesting facts. The vascular elements are differentiated in the floating, dorsiventral stem, those of the dorsal region being tracheids of small caliber, and those of the ventral region being vessels of large caliber. The transverse section of the xylem is circular, the circle being incomplete alternately on the right and left sides in the dorsal region; so that the section is really an arc which is open alternately right and left, corresponding to the alternating leaf traces. The heavy vessels of the ventral region are connected exclusively with the roots. The interpretation suggested is that the dorsal group of vessels represents a reduced bipolar group, connected at the poles with leaf traces; and that the ventral group is merely an "apolar" mass related to the roots. The amount of vascular tissue retained would seem to be a remarkable feature in a stem with such an extremely hydrophytic habit.—J. M. C.

Germination of Helianthus.—MILLER³⁷ has studied the transformations of the reserve materials of the sunflower during germination. The work shows both chemical and biological excellence. Main emphasis is put upon the transformation of fats. The fats extracted from the cotyledons show low acid values at all times, while those from the hypocotyl very early, and continuously thereafter, show high acid values. It was not determined whether the fats are translocated as such or as hydrolyzed products. The iodine value of the fats falls as germination advances, due as the author believes to the absorption of oxygen. As germination progresses, the fats decrease rather rapidly, while the carbohydrates increase. This furnishes further evidence for the established view that during germination fats are transformed to carbohydrates.—WILLIAM CROCKER.

³⁶ QUEVA, C., *L'Azolla filiculoides* Lam., étude anatomique. Mém. Soc. Hist. Nat. Autun **23**: pp. 24. figs. 22. 1910.

³⁷ MILLER, EDWIN C., A physiological study of the germination of *Helianthus annuus*. Annals of Botany **24**: 693-726. 1910.